

Fluid is pumped down a supply line 20 to a fluid accumulator 92 located upon the well head 94. The fluid is then pressurised and passes into the pressure lock chamber 96 and flows down into the borehole 70, in the annulus formed around the coiled tubing 23. The fluid passes into the drill bit 22 and thence up through the coiled tubing and back to the vessel for filtering and recirculating. The pressure lock chamber included dynamic seals 98 which allow the coiled tubing to be fed into the borehole whilst the pressure is maintained. Pump, motor and traction units 100 aid the fluid flow as well as altering the weight on bit.

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Alternative embodiments using the principles disclosed will suggest themselves to those skilled in the art, and it is intended that such alternatives are included within the scope of the invention, the scope of the invention being limited only by the claims.

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What is claimed is:

1. An apparatus for downhole drilling of wells comprising;
- 20 a drilling unit comprising a drill bit for penetrating into a rock formation, a motor arranged to drive the drill bit, the motor including a hollow shaft which permits the passage of fluid therethrough,
- 25 tubing upon which the drilling unit and motor are suspended,

control means which monitor and control the action of the motor and/or drill bit, and

cable means disposed along the tubing.

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2. An apparatus according to claim 1, wherein the tubing is a length of continuous coiled tubing.

10 3. An apparatus according to claim 1, wherein the cable means is disposed within the tubing.

4. An apparatus according to claim 1, wherein the hollow motor is a brushless DC motor providing direct control over the speed and torque of the drill bit.

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5. An apparatus according to claim 1, wherein at least one sensor is provided between the motor and the drill bit.

20 6. An apparatus according to claim 5, wherein the sensor or sensods include a rock type sensor such as an x-ray lithography sensor.

7. An apparatus according to claim 6, wherein formation type input means are provided to the control means from the rock type sensor.

25 8. An apparatus according to claim 5, wherein the at least one sensor

includes pressure and temperature sensors.

9. An apparatus according to claim 1, wherein speed and torque input means are provided to the control means.

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10. An apparatus according to claim 9, wherein the speed and torque input means are provided by direct electrical measurements of the motor.

11. An apparatus according to claim 5, wherein drill bit type input means  
10 are provided to input the type of drill bit being used corresponding to the particular drilling operation.

12. An apparatus according to claim 1, wherein the control means is provided with direction output means to control the direction of the drilling  
15 by input to a directional drilling control means.

13. An apparatus according to claim 1, wherein the control means operates a thrust means capable of urging the drill along the well.

20 14. An apparatus according to claim 13, wherein the thrust means includes an eccentric hub type thruster.

25 15. An apparatus according to claim 13, wherein the thrust means is a plurality of thrusters arranged along the length of the coiled tubing to enable the drilling of very long wells.

16. A method of downhole drilling using an apparatus according to claim 1.
- 5     17. A method according to claim 16, wherein mud is pumped down the inside of the coiled tubing, through the hollow shaft of the motor, and to the bit in order to wash the cuttings away from the bit and back up the well through the annulus formed between the side of the well on the one hand and the outside of the coiled tubing and the motor on the other.
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18. A method according to claim 16, wherein mud is pumped down the annulus formed between the side of the well on the one hand and the outside of the coiled tubing and the motor on the other, and thence to the bit in order to wash the cuttings away from the bit and back up the well through the hollow shaft of the motor and the inside of the coiled tubing.
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19. A pump disposed along the tubing which causes or supplements the method according to claim 16.